IW 2000+

INPUT

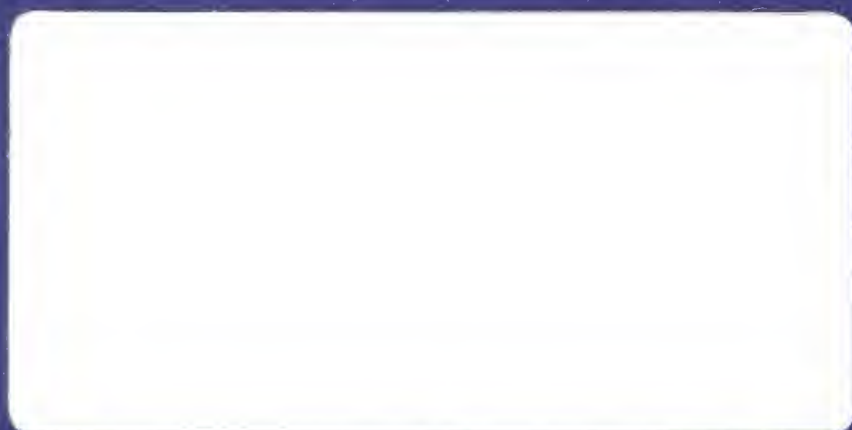## Information Services
Opportunities & Trends, 1994-1999

Education

U.S. Market Analysis Program

Information Services
Opportunities & Trends, 1994-1999

Education

May 1994

INPUT®

INPUT ®

INTERNATIONAL IT INTELLIGENCE SERVICES

Clients make informed decisions more quickly and economically by using INPUT's services. Since 1974, information technology (IT) users and vendors throughout the world have relied on INPUT for data, research, objective analysis and insightful opinions to prepare their plans, market assessments and business directions, particularly in computer software and services.

Contact us today to learn how your company can use INPUT's knowledge and experience to grow and profit in the revolutionary IT world of the 1990s.

SUBSCRIPTION SERVICES

- **Information Services Markets**
  - Worldwide and country data
  - Vertical industry analysis
- **Business Integration Markets**
- **Client/Server Applications and Directions**
- **Client/Server Software**
- **Outsourcing Markets**
- **Information Services Vendor Profiles and Analysis**
- **EDI/Electronic Commerce**
- **U.S. Federal Government IT Markets**
- **IT Customer Services Directions (Europe)**

SERVICE FEATURES

- Research-based reports on trends, etc. (Over 100 in-depth reports per year)
- Frequent bulletins on events, issues, etc.
- 5-year market forecasts
- Competitive analysis
- Access to experienced consultants
- Immediate answers to questions
- On-site presentations
- Annual conference

DATABASES

- **Software and Services Market Forecasts**
- **Software and Services Vendors**
- **U.S. Federal Government**
  - Procurement Plans (PAR)
  - Forecasts
  - Awards (FAIT)
- **Commercial Application (LEADS)**

CUSTOM PROJECTS

For Vendors—analyze:

- **Market strategies and tactics**
- **Product/service opportunities**
- **Customer satisfaction levels**
- **Competitive positioning**
- **Acquisition targets**

For Buyers—evaluate:

- **Specific vendor capabilities**
- **Outsourcing options**
- **Systems plans**
- **Peer position**

OTHER SERVICES

Acquisition/partnership searches

INPUT WORLDWIDE

Frankfurt
Sudetenstraße 9
D-35428 Langgöns-
Niederkleen
Germany
Tel. +49 (0) 6447-7229
Fax +49 (0) 6447-7327

London
17 Hill Street
London W1X 7FB
England
Tel. +44 (0) 71 493-9335
Fax +44 (0) 71 629-0179

New York
400 Frank W. Burr Blvd.
Teaneck, NJ 07666
U.S.A.
Tel. 1 (201) 801-0050
Fax 1 (201) 801-0441

Paris
24, avenue du Recteur
Poincaré
75016 Paris
France
Tel. +33 (1) 46 47 65 65
Fax +33 (1) 46 47 69 50

San Francisco
1881 Landings Drive
Mountain View
CA 94043-0848
U.S.A.
Tel. 1 (415) 961-3300
Fax 1 (415) 961-3966

Tokyo
Saida Building, 4-6,
Kanda Sakuma-cho
Chiyoda-ku, Tokyo 101
Japan
Tel. +81 3 3864-0531
Fax +81 3 3864-4114

Washington, D.C.
1953 Gallows Road
Suite 560
Vienna, VA 22182
U.S.A.
Tel. 1 (703) 847-6870
Fax 1 (703) 847-6872

**U.S. Information Services Market
Analysis Program**

Education

*Information Services Opportunities and
Trends, 1994-1999 Forecast Update*

Table of Contents

Exhibits

(Blank)

I

Introduction

A

Purpose

The purpose of this forecast report is to identify key changes in the market for information services in the education sector, and to provide the 1994 INPUT forecast for this market sector.

Sector Definition—The education information services market includes SIC codes 821, 822 and 823 and is divided into three principal applications subsegments:

- Administrative applications

- Academic research/courseware applications

- Library applications

Administrative applications include education-specific administrative applications and networking of intra- and intercampus IS resources.

Academic research/courseware applications contain software for curriculum instruction and computer literacy at all academic levels, including vocational/technical schools. It also includes teacher, professor or department-specific research projects.

Library applications comprise catalog maintenance and information retrieval, circulation control, loans and reservations, acquisitions, periodical control, indexing, and text search and retrieval. Also added are on-line library computer services, incorporating search and cataloging services.

B
Organization

The balance of this report is organized as follows:

- Chapter II—"Trends, Events and Issues," discusses the effects of educational reform, technology and budget concerns at all institutional levels. This chapter also looks at other issues, activities and changes that can have an impact on the current and future use of information services in the education marketplace.

- Chapter III—"Information Services Market," presents an analysis of the expenditures for information services by product/service market and submarket for the U.S. education market sector.

- Appendix A—which contains the "Forecast Database," presents a detailed forecast of user expenditures by information services product/service market and submarket sector, for the education vertical market. A reconciliation to the previous forecast is also provided.

C
Methodology

Ongoing Research—Much of the data upon which this report is based has been gathered during 1993 and early 1994 as part of INPUT's ongoing market analysis program. Trends, market sizes and growth rates are based on INPUT research and in-depth interviews with users in the education marketplace and the information services vendors serving that market. INPUT maintains ongoing relationships with, and a database of, all interviewed users and vendors. Interviewees for the research portion of this report were selected from this database of contacts.

Resources—Extensive use was made of INPUT's corporate library located in Mountain View, California. The resources in this library include on-line periodical databases, subscriptions to a broad range of computer and general business periodicals, continually updated files on more than 3,000 information services vendors, and the most recent U.S. Department of Commerce publications on economic and industry statistics.

Chapter I-2 MVED

Forecast Estimates—Vendors, when responding to interviewers or questionnaires, may be unwilling to provide detailed revenue breakouts by product/service market segment or industry. Also, vendors often use different categories of industries and industry segments, or view their services as falling into different product/service market segments from those used by INPUT. Thus, INPUT must estimate revenue for these categories on a best-effort basis. For this reason, the product/service market forecasts and industry segment forecasts should be viewed as indicators of general patterns and trends rather than specific, detailed estimates for individual years.

D
Related Reports

In addition to this market-specific report, the reader may also be interested in other INPUT-related reports, which address specific product/service markets and the U.S. and Worldwide markets for information services. Such reports would include the following INPUT publications:

- *U.S. Processing Services Market, 1993-1998*

- *U.S. Professional Services Market, 1993-1998*

- *U.S. Network Services Market, 1993-1998*

- *U.S. Applications Software/Turnkey Systems Market, 1993-1998*

- *U.S. Systems Integration and Outsourcing Markets, 1993-1998*

(Blank)
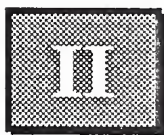
Trends, Events and Issues

A
Background

(The following background statement first appeared in our 1993 report on the education marketplace. It defines the key differences between the education market and all other, more "traditional" business markets. INPUT believes it bears repeating, so that the trends, events and issues which follow can be placed in the proper perspective.)

Unlike other market sectors on which INPUT reports, the education market is not so much an industry as it is an institution. A high school education is regarded by most Americans as a fundamental right and the minimum level of academic training necessary to function as an adult in our society. Most adults (and businesses) consider a college education necessary for entry to higher-paying jobs in all industries. Almost all professions require an advanced (postgraduate) degree before an individual can be certified to practice a specific professional calling.

From Abe Lincoln trudging miles in the snow to obtain a grade-school diploma, to Rhodes scholars pursuing off-shore studies to broaden their perspectives, educational training is not only a fundamental right in these United States, it is the law.

Education is a topic upon which every teacher, student, politician, parent, cleric and businessman has an opinion. The reason for the interest is obvious—the products of our educational system are the most valuable resource that America has in the highly competitive world economy. Our educational system produces our scientists, businessmen, healers, statesmen and teachers. Our trade schools produce our craftsmen and skilled labor-force. Many clerics are concerned with the religious content, if any, of

our curricula. Ethnic groups want equal access to education and equal opportunity after attaining a degree. Those with various handicaps hope to achieve their individual potential, provided that specialized educational resources are made available.

It is no wonder that this market sector draws so much interest. It is also no surprise that there are a number of trends, events and issues influencing this market in 1994 and beyond. The balance of Chapter II discusses and analyzes these market influences.

B
Overview

In contrast to most other industry sectors about which INPUT prepares information services market forecasts, the education market is relatively stable. There is a predictable flow of students (customers for its *product*); most financials, sources and expenditures of funds, are open to public view; and its environment and activities tend to be highly structured and slow to change. Accordingly, the overall assessments of this marketplace contained in INPUT's January 1992 report on the education sector, and the forecast update published in April 1993, are still valid. Significant changes that affect the information services market are noted in this forecast update and discussed in this and the following chapter.

C
Trends and Events

This section examines the growth of the education industry, the external factors affecting this market sector and the current trends in the use of information services.

1. Education Industry Growth

From any point of view, education is a growth industry. This section examines the numbers which reflect that growth, with emphasis on changes in enrollment, the teacher population and expenditures for education and academic libraries.

Enrollment—According to the U.S. Department of Education, enrollment at all academic levels is up 2.4%, from 62.4 million students in 1992 to 63.9 million in 1993. It is forecast to grow 2.8% from 1993 to 1995 to 65.7 million students. The growth from 1995 to

2000 is expected to be 6.4%, resulting in a total student population of 69.9 million students at the start of the new millennium, with a five-year compound annual growth rate (CAGR) projected at 1.2%. For K-12, most of the student increase has been and will be in the public schools, with private school populations remaining constant at about 11% of all students. National Center for Education (NCES) projections forecast record levels of enrollment in the late 1990s, surpassing the baby-boomer high in 1971. This trend will continue into the next century. Between 1993 and 2000, public elementary enrollment is projected to grow by 10%, while public secondary school enrollment will increase by 16%. The obvious conclusion is more school age children are now attending elementary schools and more of them are continuing to secondary levels.

College and university enrollment was expected to reach 15 million in 1993, up from 14.1 million in 1991. Despite decreases in the traditional college-age population, increases in the number of older women students, and the growing number of recent high-school graduates attending college is pushing enrollment levels higher.

To some degree, educational institutions have benefited from the constraints put on the job market by the recent recession. Unable to find jobs, many high school students go on to college and many baccalaureate graduates pursue advanced degrees. The trend is driven by the recognition of the limitation on job opportunities in our present economy, and the competitive advantage of an advanced degree.

Teacher Population—An estimated 2.8 million K-12 teachers were in the classrooms in 1993, up 11% from the 1985 population. The 1993 split was approximately 2.5 million public and 0.4 million private school teachers. Approximately 1.8 million were teaching in elementary schools and 1.1 million in secondary institutions. The number of teachers has risen faster than the number of students, resulting in a desirable reduction in classroom student/teacher ratios. Projections through 2000 show that the growth for all teachers will be at a 1995-2000 CAGR of 1.5%, with the majority of that growth occurring during the period 1995-1997. The number of college and university instructors will increase at a 1995-2000 CAGR of 1.6%, while the K-12 instructor population will grow at a 1.5% rate during the same period. Public

institution teacher populations will increase at a 1.5% CAGR, while private schools will grow at 1.4%.

Expenditures—Expenditures for all public and primary education, from preprimary through graduate school, were estimated to be $466 billion in 1993, or about 7.8% of GDP. Expenditures for the five-year period 1988-1993 grew at a CAGR of 8.3% for all schools, with year to year growth for K-12, and colleges and universities at 8.2% and 8.3%, respectively. The increase in total education expenditures from 1992 to 1993 was 5.7%, with K-12 at 5.6% and colleges and universities at 5.7%. INPUT expects increases in spending for education to reach the 8% level during INPUT's forecast period (1994-1999), as a healthier economy generates more revenues at local, state and federal levels. In addition, increased funding should start to flow from the private and public sectors as a result of the continuing emphasis on the national advantages of a strong educational resource to generate the people assets of American industry.

Academic Libraries—Expenditures for libraries fell from 3.9% of college budgets in the mid-1970s to about 2.9% in the late 1980s. Currently, they are stabilizing at about 2.5-3% and should remain at that level through the balance of this decade. Expenditures at the K-12 level are less, due to the narrower range of topics and research media (e.g., on-line systems)—they are averaging and will continue to average about 1.5% of total institutional expenditures.

2. External Trends and Events

As they have been for the last few years, the primary external trends affecting education programs and expenditures continue to be:

- Budget restraints resulting from decreased tax revenues and the slow pace of recovery after the recent economic slowdown

- Diversity in the student population, causing many and varying educational requirements

- A wide variance in school facilities, based on the level of local, district or county support

- Curriculum reform

Each of these trends is discussed in further detail below.

a. Budgets

Budgets for educational institutions at all levels continue to be a major concern. For public primary and secondary schools, as well as state colleges and universities, taxes are the primary source of funds. Unemployment, however, has eroded the tax base for many communities, and even though there is currently a visible trend toward higher levels of employment, tax revenues resulting from this increase will flow very slowly. Tax reforms, such as California's Proposition 13, are being considered by some states as a component of broader programs to reduce deficits and bring state spending under control, but if they are implemented, their effect will be to further reduce funds for schools. This was the result in California when many educational programs lost their funding as a result of Proposition 13.

The federal budget, a key issue in the recent presidential campaign and a major concern of the Clinton administration, continues to undergo rigorous scrutiny with the intent of reducing existing deficits and future spending.

At the end of 1993, the United States appeared to have weathered the recent economic slowdown and returned to a growth economy. Growth, however, is expected to be moderate—3% per year over the next few years, and unemployment levels are forecast to remain at higher than normal levels for some time to come.

The relevance of these economic realities is that tax revenue (from all sources) to fund public schools and colleges will continue to be constrained—probably to levels that will meet basic educational requirements, but will leave limited funding for curriculum enrichment or significant new educational resources. Balancing this to some small degree, however, is the growing trend of the business community to provide resources to schools and colleges through grants, donations or cooperative programs. Gifts and donations from parents, parent support groups, alumni and philanthropic groups also increase educational budgets.

There is strong evidence that funding is receiving attention at the grass roots level. A recent poll, the *25th Annual Phi Delta Kappa Gallup Poll of the Public's Attitudes Towards the Public Schools*, noted that the public feels that lack of proper financial support is

now the biggest problem facing America's public schools. This problem is viewed as more important than drug abuse, lack of discipline, gangs and the standards for and quality of education, which rank second through fifth. Since the public can bring pressures at virtually all levels of education and can vote the financial measures necessary to provide increased funding, funding problems should start to receive strong and effective attention over the next few years.

America 2000 is a major federal program that has the stated objective to increase the worldwide competitiveness of the American labor force, by the year 2000, through the improvement of the American school system. A key component of the America 2000 program is the New American Schools Development Corporation, NASDC, a nonprofit, short-term foundation charged with creating a nationwide systemic change in American education by funding innovative community educational reforms.

As of January 1993, 668 proposals from communities requesting grants were received by NASDC. By April 1993, 11 had received tentative approval. INPUT was unable to obtain similar numbers for 1994, but the slow pace of the America 2000 program continues to be disappointing to many who hoped that it would rapidly infuse new thoughts and new money into the American educational system. Many now view the program as having too many political overtones to achieve its intended goals, but all agree that there is a need for a stated national agenda for education, and the America 2000 program is a major step in that direction.

Regardless of tax or economic constraints, INPUT believes that educational institution budgets will grow from the modest 5% to 6% noted in last year's report to a somewhat more aggressive rate of 8% to 8.5% over the next few years as more funds are funneled into educational institutions from a healthier economy and as a result of increased public awareness of need.

b. Diversity

Diversity takes many forms in the educational environment. It includes those with different learning capabilities, language skills, economic backgrounds, ethnic origins and an increasing number of physically handicapped individuals who can be a part of the educational process. Virtually all educational systems now recognize diversity as a normal component of the educational

process, and most teachers are skilled in dealing with it in the classroom.

Fortunately, one of the most effective tools to use with a heterogeneous class mix is the computer. In-class PCs, running sophisticated curriculum software, allow a teacher to more easily tailor instruction to individual student needs. In addition, the student has a powerful tool that, once mastered, is useful at all levels of education. CD ROMs allow students to view the same material, but hear narrative in two or more languages. Multimedia offers a mixture of sound, video and text in an interactive mode, which stimulates and teaches the student.

Diversity is a challenge, but it no longer has to be a major stumbling block for the educational system. For many situations, PC-based alternatives will be effective solutions. Yet, as with most technical solutions, implementation can be costly and levels of implementation will always be subject to budget constraints.

c. Variations in School Facilities

It is a fact that at all levels of American education, there is great variation in the school facilities available in many districts, depending upon the level of district, county or state support. To some extent, this is also true of colleges and universities. Most schools have adequate heating, light and ventilation. But ironically, electrical outlets in the classroom and telephone lines capable of supporting client/server or LAN activities for shared resources are typically in short supply. This means that before many schools can take advantage of most forms of computer-assisted instruction, they must first bring electrical current to the classroom in sufficient quantity (and location) to support student use.

An alternative step to bringing the computer to the student is to bring the student to the computer. This is the approach used by many schools which establish a *learning center* or *computer laboratory,* centralizing training in a single classroom using multiple PCs or terminals. Many teachers favor this approach because it is less disruptive of traditional teaching techniques, and tends to concentrate computer resources where they are most efficiently used. Courseware, especially that delivered in a client/server environment, is regarded by many instructors as most efficiently delivered in the *learning center* environment. In

fact, courseware specifically designed for this environment is termed an Integrated Learning System (ILS) or an Integrated Instructional System (IIS).

In addition to providing electrical power for PCs, most schools are also considering connecting computing resources (usually throughout a school district) using local networks. Because most elementary and secondary schools do not have multiple telephone lines to classrooms, the use of computers in a networked environment requires either recabling the school, or laying LAN cabling in on top of existing telephone resources. Either approach is complex and expensive and most school district RFPs for computer resources include a requirement for designing and installing a network capability.

Colleges and universities tend to have better facilities and usually have some centralized computer resource(s) connected via LANs, WANs or MANs to departmental systems and student dormitories. But implementation of expanded computing capabilities at these levels will still require the network resource to which the computers and their communications linkages can be attached.

For schools at all levels, however, mundane items such as telephone and power outlets are like horseshoe nails in battle. Without an adequate supply of them, the battle, or the value of computers in education, is easily lost. With sufficient power and communications interfaces, all things seem possible.

d. Curriculum Reform

Much has been stated in other venues regarding the need for curriculum reform. Stated needs vary from modernizing courses and courseware (e.g., discarding legacy courseware) to improving grading techniques or eliminating grading completely. Computers are not curricula. They are the tools with which various curricula can be implemented—efficiently and quickly. Computers do have a part in curriculum reform—but that role is as a means, not as an end. Thus, as reforms occur at all levels, there will be a growing role for computers in the educational process.

3. Information Services Trends in Education

Information services activities in education tend to fall into three broad categories—academic courseware, administrative applications (for K-12 and higher education) and expanded on-line and CD ROM services for academic libraries. Each area is briefly considered in the following paragraphs.

a. Academic Courseware

There has been steady progress in the acceptance and quality of computer-aided instruction (CAI) in K-12, where many now regard computer literacy as a fundamental skill. In fact, the U.S. Department of Education estimated that by the fall of 1990, 97.2% of all U.S. K-12 schools used microcomputers—although most schools still feel that PCs are in limited supply. Higher education has been slower to embrace commercial courseware (due to an ingrained belief that university instruction is somehow unique), but there too, acceptance of CAI is growing. The future for such courseware, however, is generally believed to lie with client/server systems (e.g., IIS or ILS), and for most schools, client/server and the microcomputer (PC, Apple and Macintosh) will be the vehicles for implementation. Multimedia will also offer the opportunity for integrating educational modules to stimulate all the senses and improve and enhance the learning process.

b. Administrative Applications

Although academia is not generally regarded as a business environment, the fact is the education process must run with balanced budgets and proper accounting for resources and student achievement. There is an expanding family of K-12 administrative applications designed to improve the management and accounting process and automate record-keeping. Most of these applications are microcomputer-based. In higher education, the major activity is the expansion of local (campus) and national networks to permit effective resource sharing and improved instructor productivity. Administrative applications are also well-received, although many institutions develop their own tailored programs. Most institutions are also exploring the benefits of multimedia instruction. The primary concern is cost, and such systems tend to be as effective as their weakest component.

c. Academic Libraries

Technical areas of primary interest to academic libraries are CD ROM, on-line services, E-mail and imaging. CD ROM and on-line services are proliferating, with most university campuses offering remote access to many library facilities. Using the same systems and networks, comprehensive E-mail systems are also being provided. Imaging offers exciting opportunities for document storage and retrieval, but costs for such systems, even at the lower end, are still prohibitive and generally out of the reach of academia.

D

Issues

The key IS issues for K-12 continue to be a cost-sensitivity to IS solutions which is driven by endemic budget constraints. This condition is a result of funding constraints at all levels—federal, state and local, but these will be relieved as the return to economic growth gets stronger, enrollment increases and unemployment continues to drop. Teachers with effective computing skills are still in limited supply in the classroom, inconsistent software quality remains a problem and software vendors still face the profitability dilemma posed by low-margin educational versus high-margin commercial packages. Physical plant limitations such as electrical outlets, telephone lines and LANs are ongoing concerns.

Administrative systems are logical candidates for RDBMS, and many campuses are implementing this new technology. The obvious benefit is an integrated administrative system, but concerns include budget limitations and accountability.

Academic libraries—essentially knowledge databases, are perhaps the most logical beneficiaries of computing technology. Unfortunately, they also have the most limited funding. Most libraries are still years away from offering fully automated search and retrieval systems, with global access to files shared among institutions, business and governments. However, many have expanded or added CD ROM and on-line search capabilities using resources such as the Internet, and library consortiums will continue to improve the level of academic information storage and retrieval.

E
Commentary

As will be noted in the following chapter, *Information Services Market*,—the K-12 Courseware market is the second largest in the education sector. Many also see it as the foundation for learning experiences that structure our learning skills and establish the basis for future intellectual growth. One viewpoint holds that the K-12 educational environment is undergoing a paradigm shift in which traditional curricula are being enhanced to include not only the "3R's" but also lifelong learning skills which will prepare students to live and perform effectively in the new "information age."

 For many school districts, computer literacy is regarded as a basic skill, and woe be unto any college undergraduate who must use pencil, paper, a calculator or slide rule to compete with other students using laptops, word processors, scientific programs, graphics packages, relational databases and modems.

Although its ability to spend real dollars is small, American industry recognizes the value of the K-12 market, and for years suppliers such as Apple have been underwriting education with the knowledge that if you grow up learning to do your work on an Apple or Macintosh system, you will probably carry that preference into your business and personal life.

However, funding limits are still a major barrier to growth and even when subsidized, the costs of IS solutions, in terms of K-12 budgets, are high. Regardless, INPUT believes the investment will be made. Anything else is unthinkable, since the result would be a labor force that lacks critical technological skills and would be at a competitive disadvantage on the world market.

(Blank)
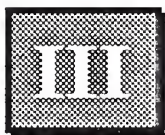
Information Services Market

This chapter discusses the expenditures for information services in the education marketplace. User expenditure forecasts are provided for the education industry by industry sector and product/service market sectors. Assumptions driving the forecasts are presented. Note that these forecasts do not include functional, general-purpose information services such as those used for human resources, accounting or generic planning and analysis. The markets for these types of information services are presented in cross-industry Market Analysis Program reports rather than in the industry-specific reports.

Note that the numbers used in the exhibits are rounded. Precise values are used in the text and Appendix A, the "Forecast Database."

Section A, "Overview," notes the overall size and growth rate of the education market's expenditures for information services.

Section B, "Product/Service Market Sector Analysis," segments the data into INPUT's seven standard product/service market categories.

Section C, "Industry Segment Analysis," restructures the forecast in terms of the major market segments within the education industry. These segments are:

- K-12 Administrative

- K-12 Courseware

- Higher Education Administrative

- Higher Education Academic/Courseware

- Academic Libraries

A
Overview

The academic education information services market includes software and services for K-12, colleges (including two-year vocational/technical schools), universities and academic libraries. There are also separate administrative and curriculum courseware markets.

The information services requirements are unique for each of the segments. As a result, most of the companies that provide information services to the academic education markets specifically address one of the three market subsectors—K-12, higher education or libraries. In addition, companies that produce academic courseware or administrative software usually represent two different vendor types.

In 1994, the academic education market (as distinct from education and training cross-industry market) is expected to be almost $2.3 billion, or approximately 1.5% of the $151 billion total information services market forecast for this year.

INPUT projects a 12% CAGR in the total U.S. information services market for the period 1993-1998 (the current Total U.S. Forecast period). The 1994-1999 U.S. Forecast will be available later this year. The academic education market is also expected to increase at a compound annual growth rate (CAGR) of 12%, from almost $2.3 billion in 1994 to more than $4 billion in 1999, as shown in Exhibit III-1.

Exhibit III-1

Education Sector—Information Services Market, 1994-1999
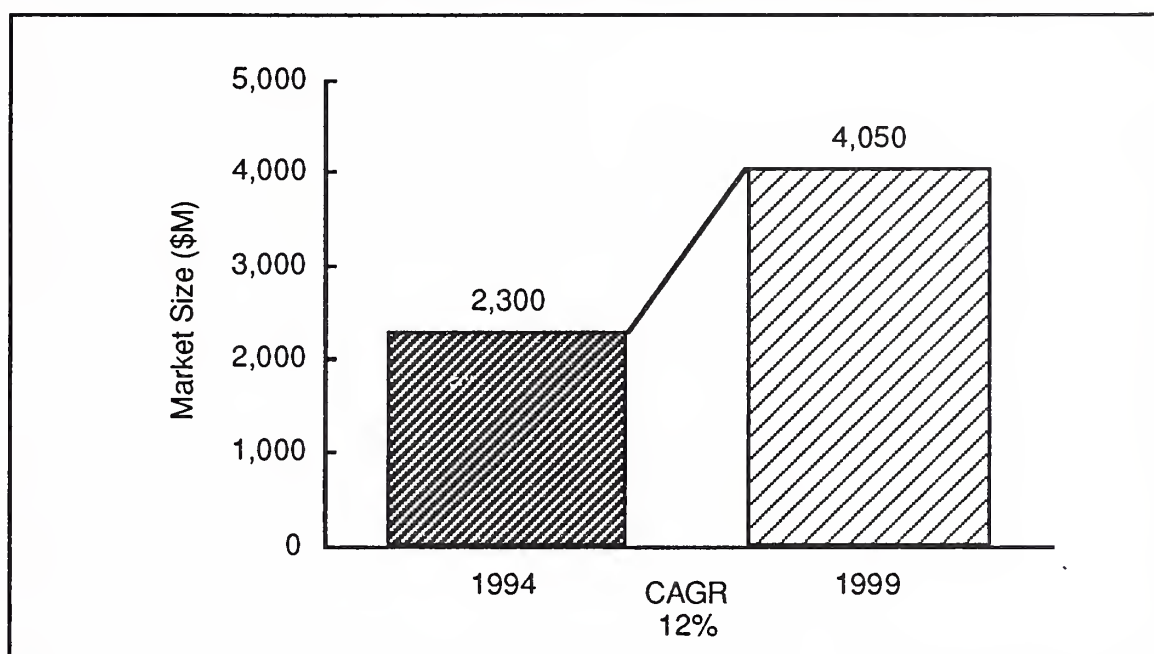
Note: Values have been rounded.

Although the current five-year growth rate projections for the total IS market and the education market sector are the same, two factors will continue to have an effect on the education sector.

- The enrollment projected for elementary schools in prior years has now been adjusted by the National Center for Educational Statistics to reflect a 10% growth rate through the year 2000, while secondary school enrollment will increase by 16%. Because elementary schools provide the raw material for secondary schools, colleges and universities, enrollment at the senior institutions is now also projected to increase.

  More school age children are attending elementary schools and more are continuing on to secondary levels. Despite decreases in the traditional college-age population, college and university enrollment was expected to reach 15 million in 1993, up from 14.1 million in 1991. This growth is the result of increases in the number of high-school students and the number of older women students now attending college.

- Total public and private school budgets in the United States grew 5.7% from 1992 to 1993 (as they did from 1991 to 1992), and are expected to return to an annual growth of 8% (the 1988-1993 CAGR was 8.3%) over the next five years. However, there is continuing budget sensitivity in all the academic education markets. This sensitivity is a considered response to recent reductions in state aid to education, based in part on changing patterns in student enrollments, cutbacks in federal grants for education, and reductions in the corporate tax base in many inner-city and rural environments.

  Stated another way, the budgetary concerns are a logical response to the recent prolonged economic slowdown. Although it is unlikely that there will be budgetary growth beyond the 1988-1993 8.3% rate, parental concerns with the lack of proper financial support for public (K-12) schools, and the ability of taxpayers to vote for increases in school funding will serve as a driving force for public school annual budget growth—that is, raise the growth to the 8% per-year level over the forecast period, 1994-1999.

  Public and private colleges and universities will meet increased costs (and increase budgets) through tuition increases and increased corporate sponsorship of educational programs and resources.

Clinton's educational agenda is still not clearly stated, and most of the educational imperatives (including America 2000) have been inherited from Bush's administration. Unfortunately, at this time, much of this administration's attention appears to be focused on national health care and answering political inquiries into personal conduct. The administration has indicated a desire to improve federal programs supporting education (e.g., student loans), but the implementation and effectiveness of such plans is yet to be seen.

Providing educational opportunities for those who will provide the sales which offer the U.S. economy a competitive edge to the world labor market is both good government and good business.

B

Product/Service Market Sector Analysis

Forecasts by product/service market sector for user expenditures in the education sector are shown in Exhibit III-2. INPUT analyzes the vertical information services markets by seven such sectors, and the next sections discuss the growth projections for each of them:

Exhibit III-2

Education Sector
Information Services Market by
Product/Service Market Sector, 1994-1999

Sector	1994	1999	CAGR (Percent)
Professional Services	110	180	10
Systems Integration	140	310	17
Outsourcing	330	730	17
Processing Services	210	230	2
Network Services	300	640	16
Applications Software	930	1,600	11
Turnkey Systems	280	390	7

Market Size ($M)
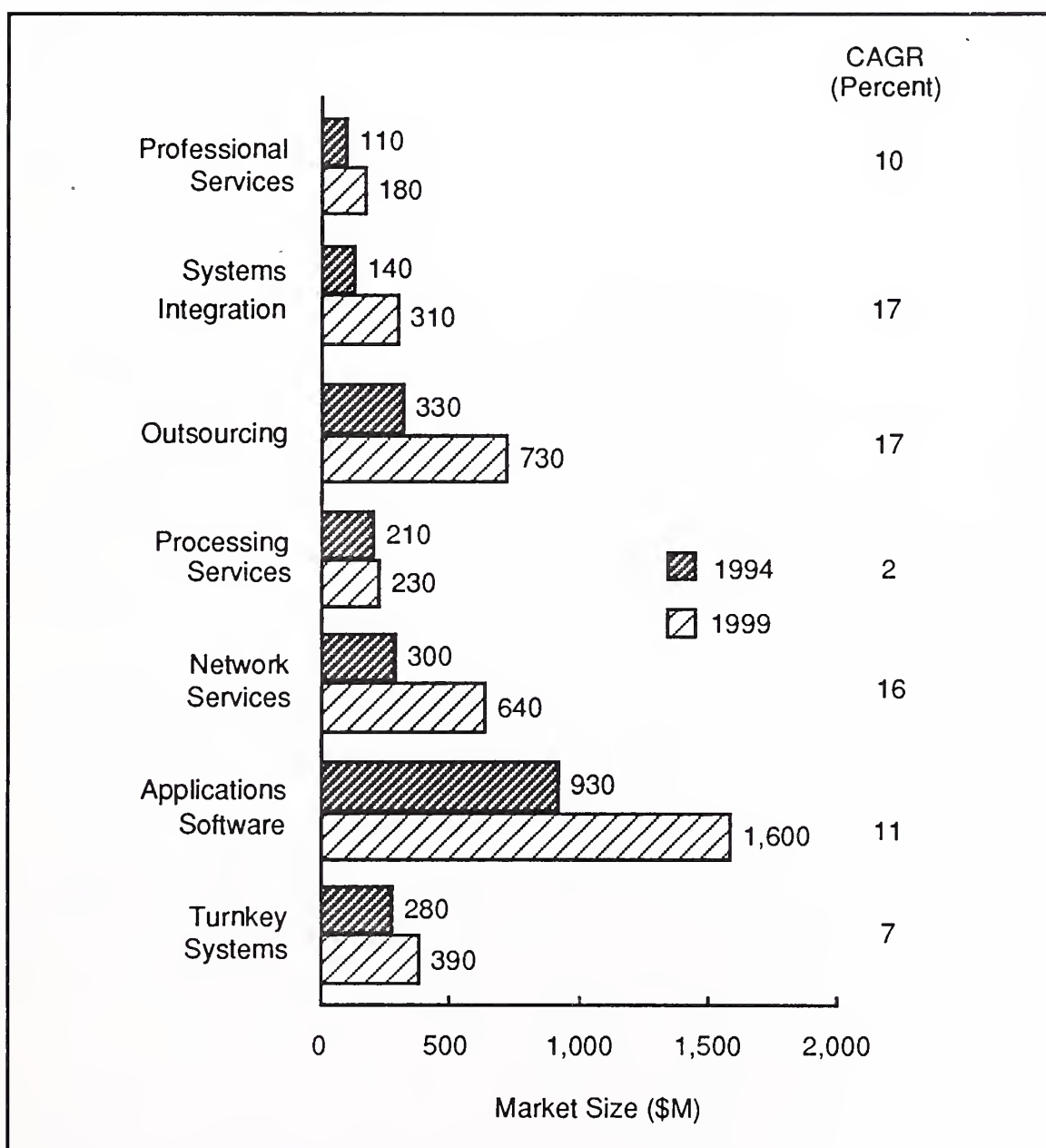
Note: Values have been rounded.

1. Processing Services

INPUT defines processing services for the educational market as transaction processing services. This can involve third-party processing of administrative applications, use of remote supercomputer facilities for research applications, and test scoring and statistical analysis by service bureau-type operations.

Expenditures for processing services in the education information services market will continue to grow at a 2% annual rate, increasing from more than $210 million in 1994 to more than $230 million in 1999. The trend toward providing administrative applications on in-house computers has had, and will continue to have, a negative impact on the growth in processing services. Local school district service bureau consortiums, which provide administrative applications, are not included in the processing services information services market figures because they are considered to serve a captive market.

2. Turnkey Systems

Turnkey systems are closely related to processing services in that they represent a standard, parametric approach to satisfying users' requirements. These alternatives generally provide the least flexibility for the user and tend to make the user more dependent upon the vendor. They are most frequently used by the smaller schools which have simple, repetitive operations and cannot afford the overhead necessary to provide their own data processing capabilities.

Turnkey systems applications integrate systems software, packaged or customized applications software, a CPU and related equipment and peripherals.

User expenditures for turnkey systems will continue to show the second slowest growth rate, 7%, in the educational information services market over the next five years. From almost $280 million in 1994, the turnkey systems education market is expected to increase to nearly $390 million in 1999.

The CD ROM market offers an exciting growth opportunity for turnkey systems vendors, particularly in the library environment. The popularity and effectiveness of the CD ROM as a training and

applications tool is demonstrated by it's growing use with business and home computers.

Turnkey systems also represents a substantial share of the K-12 administrative systems market. This area should continue to provide one of the stronger growth opportunities in the education sector for turnkey systems vendors. Unbundling of hardware and software and related services should also be considered as a competitive opportunity. A significant part of the market also includes test scoring systems delivered as a turnkey systems solution.

3. Application Software Products

The academic educational market for application software products is the largest market segment in the education industry and includes courseware, administrative and library software at the K-12 and higher education levels. The educational application software markets are expected to increase from almost $930 million in 1994 to nearly $1.6 billion in 1999, at a CAGR of 11%. The 1994 market for K-12 courseware is estimated to be more than $640 million, while more than $90 million will be spent on courseware for higher education.

The academic educational software industry consists of a large number of companies, including independent academic courseware developers who specialize primarily in the K-12 markets, textbook suppliers, computer systems companies as well as turnkey systems suppliers and smaller VARS (whose software revenues are counted under the turnkey systems product/service markets). Although there is major interest in increasing the amount of computer-assisted instruction in the K-12 classrooms by users and vendors, there are a number of factors negatively impacting faster growth in this market.

- Ongoing K-12 budget constraints for hardware and software. These result in smaller profit margins for vendors, causing the more profitable commercial (business) market to appear more attractive.

- The need to upgrade classroom computer hardware from older equipment to new, more reliable and user-friendly devices

- The need for more intensive teacher training (staff development) in computer literacy, use and teaching techniques

Client/server applications, especially in an ILS or IIS (see Chapter II) environment, offer an opportunity to blend traditional and computer-aided instruction smoothly in a structured environment. This centralized approach offers efficient equipment use and provides a supportive environment for teachers with limited computer skills.

Many educators consider the greatest opportunities for software products to be in the relatively new area of multimedia. As the limitations of single-medium software become more apparent, this category can be expected to grow more rapidly than any other. Multimedia is already in use in many schools today in the form of tools used for supplemental curriculum, reference and presentation development. Growth will continue in these core areas and expand to a broader range of courseware. The driving force will be the enthusiasm of those teachers who have already used multimedia, and report that the experience generates greater enthusiasm for learning, stimulates superior levels of research and data gathering skills and results in improved student synthesis of information and depth of analysis. At this moment, there appears to be no more effective learning tool than multimedia. However, as with most "best" solutions, a major drawback will be cost.

At this time, the commercial courseware market for higher education will continue to remain relatively small due to the complexity of the courseware required, the expense of developing such programs, and limited budgets—however, its growth rate is increasing. One reason for the improved growth is the greater use of standard application software packages in many core undergraduate courses. Another factor driving the higher growth rate is the low base from which the growth started. A growth inhibitor, at the college and university level, is the strong NIH (not invented here) factor, which tends to regard courseware from other sources as useful, but probably not as good or as applicable as software developed by the university's own staff.

The education administrative software markets typically involve different sets of vendors for higher education, K-12 and library administration. The strongest growth potential for these markets

continues to be for those applications that are microcomputer- and workstation-based.

4. Outsourcing

Outsourcing involves the use of an outside vendor to perform part of an institution's computer operations. It can require that the vendor operate all the IS data processing facilities—which can be done either on-site or off-site— and/or perform application development, business integration along with telecommunications management services.

Outsourcing has become a fast-growing market in many industries, and the education sector is no exception. As shown in Exhibit III-2, in 1994, the education sector's outsourcing expenditures will be almost $330 million, and are expected to reach approximately $730 million in 1999, with a CAGR of 17%—the highest in the education sector and a position shared with business integration services.

As the complexity of computer applications has expanded in the K-12 and higher education markets, the need for sophisticated operations management and distributed/integrated application development has been a stimulus to third-party outsourcing growth.

5. Systems Integration

The systems integration (SI) market is closely related to the market for professional services. Although it is the second smallest of the product/service market sectors, it shares the highest projected growth rate—17% CAGR, with outsourcing. Whoever bears the responsibility for planning and managing a project is the key distinction between consulting and systems integration. Consulting firms typically provide analytical or technical support to their clients and seldom bear full responsibility for the successful completion of the project. Systems integrators act as the general contractor on a project, assume project management responsibility and generally bear some financial risk for the success of the project.

The complexity of today's technology, and the industry's accelerating pace of change, makes it increasingly difficult for the user to manage large projects with a combination of in-house and

outside resources. As a result, many firms and educational institutions are transferring the risk and responsibility to SI firms.

In general, systems integration involves the delivery of large, multidisciplinary, multivendor systems, incorporating some or all of these functions: systems design, programming, integration, equipment, networks, installation and acceptance. Systems can also encompass multiple product product/service markets.

The 1994 educational market for systems integration will total $140 million. It is expected to grow at a CAGR of 17% over the next five years and reach almost $310 million in 1999. (See Exhibit III-2).

One reason for the high growth expectation for systems integration in the educational markets is the continuing need for providing intra- as well as intercampus networking capabilities—tasks which typically involve integrating diverse computers, operating systems and network architectures. At the K-12 level, there is also a growing need to interconnect local schools with district headquarters, as well as a requirement for providing interactive courseware delivery to improve curriculum quality and cost effectiveness.

In higher education, the use of outside systems integrators is limited. Contributing factors include the perceived high cost of long-term contracts, a desire to maintain integration control, and a slow movement toward distributed applications. Currently, much of the use of campus networks, especially for E-mail and interdepartmental file exchange, is accomplished through a college or university's mainframe hosts.

6. Professional Services

The professional services product/service market sector is defined as a management consulting activity related to information systems consulting, development of custom software as well as education and training.

In 1994, the educational market for professional services will be $110 million. It will grow at a CAGR of 10%, reaching about $180 million in 1999.

The educational professional services market consists primarily of services provided at the higher education level in association with sales of administrative software and custom software development. In particular, as the software solutions become more complex, there is an increasing need for consulting, education and training support services. In addition, the ability to customize standard solutions is increasing the acceptance of third-party-developed administrative software solutions in the higher education market. The demand for combining software and support services in the higher education market is expected to result in parallel growth for the professional services market and the standalone applications software market, which have five-year CAGRs of 10% or 11%.

7. Network Services

INPUT defines the network information services market as consisting principally of value-added networks (VANs), electronic data interchange (EDI), electronic information services (EIS) and E-mail. Electronic information services are defined as database, news and video text services.

The educational market for network/electronic services is projected to grow at a 16% annual rate, from nearly $300 million in 1994 to almost $640 million in 1999, with an expected strong demand for on-line database delivery and E-mail facilities.

Currently, many education sectors use academic libraries for their on-line database/news services. Educators also use K-12 on-line database programs to teach research methodologies in the social studies and science curricula. Campuses with advanced networking installations can also provide student access to network services from remote locations, such as dormitories and offer access to the Internet, which describes itself as the world's largest computer network. Al Gore, Vice President of the United States, has stated that the government's support of the Internet will be primarily for health care and educational service—good news for the education industry.

E-mail is the most common application using network services on campuses today. However, much of this usage is based on mainframe/terminal rather than mainframe/PC communications.

EDI and image processing offer high growth potential for future applications. Such growth will occur in a variety of applications, including intra- and intercampus student record keeping and full-text/graphics interchange.

C
Industry Segment Analysis

The size of the education market for 1994, by principal application segment, is shown in Exhibit III-3.

Exhibit III-3

Education Market by Segment—1994

Academic
Libraries
$460 (20%)

K-12 Courseware
$640 (28%)

K-12
Administrative
Systems
$300 (13%)

Higher Education
Administrative
Systems
$800 (35%)

Higher Education
Courseware
$90 (4%)

$ Millions

1994 = $2,290
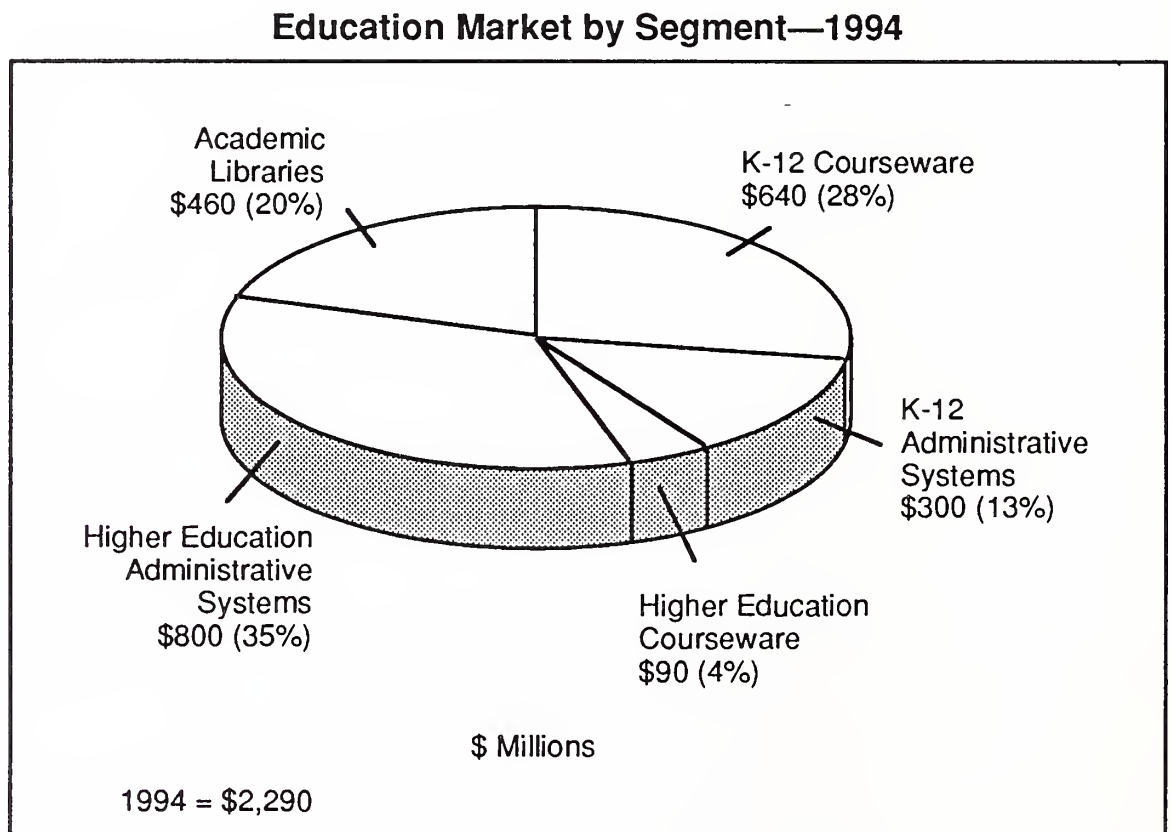
Note: Values have been rounded.

The 1994 and 1999 information services market size and five-year growth rates for the segments of the education industry market are provided in Exhibit III-4.

Education Sector Information Services Markets, by Segment
1994-1999

Note: *Values have been rounded.*

- The courseware sectors will experience faster growth in higher education (17%) than in K-12 (12%) courseware. This condition is dri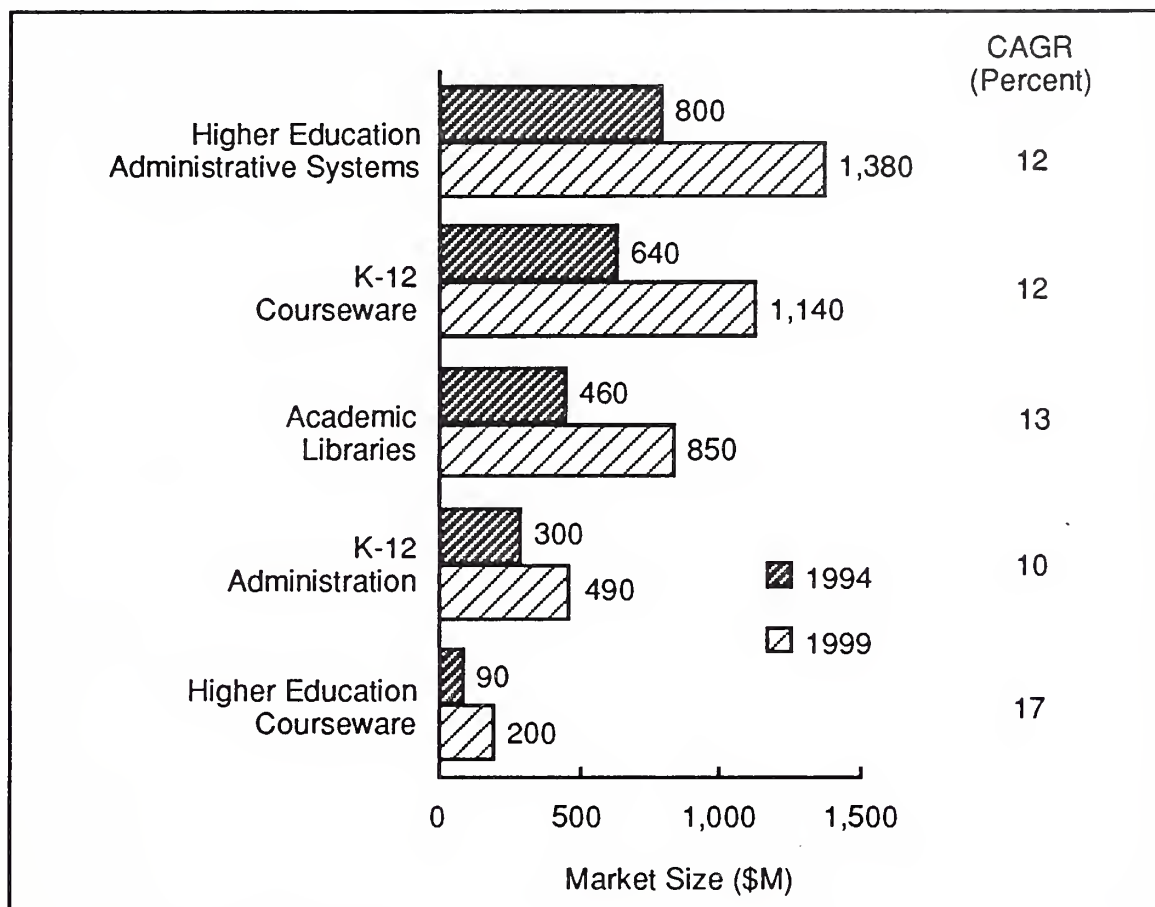ven by the growing acceptance and availability of commercial software for the higher education segment, and by the small base from which the growth started.

- Administrative systems expenditures at the higher education level are the largest market segment and are growing faster due to the greater availability of funds. In addition, there is a strong need to improve business efficiency and budget performance at the college and university level.

- The use of network services (on-line databases) and the need to build interlibrary networks fuel the academic library segment's growth. As use of the Internet grows, it will act as a growth stimulator for academic libraries as more information sources go on-line.

(Blank)

(Blank)

A
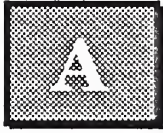
Forecast Database

This appendix contains the forecast database for the period 1994-1999 and the 1994 MAP database reconciliation.

A
Forecast Database

Exhibit A-1 presents the detailed 1993-1999 forecast for the education sector.

Exhibit A-1

Education Sector—Market Size Forecast by Product/Service Market Sector, 1993-1999

Product/Service Markets	1993 ($M)	Growth 93-94 (%)	1994 ($)	1995 ($)	1996 ($)	1997 ($)	1998 ($)	1999 ($)	CAGR 94-99 (%)
Sector Total	2,050	12	2,290	2,559	2,866	3,211	3,611	4,064	12
Professional Services	98	12	110	121	134	146	161	178	10
- IS Consulting	26	15	30	33	39	42	48	55	13
- Education & Training	15	13	17	19	21	23	25	27	10
- Software Development	57	11	63	69	74	81	88	96	9
Systems Integration	121	16	140	165	198	231	266	305	17
- Equipment	41	17	48	56	67	79	91	105	17
- Software Products	10	10	11	13	16	19	22	25	18
- Professional Services	68	15	78	93	111	129	148	170	17
- Other	2	50	3	3	4	4	5	5	11
Outsourcing	281	16	326	379	441	525	619	730	17
- Platform Operations	194	15	223	255	240	346	408	483	17
- Applications Operations	76	18	90	109	134	159	187	220	20
- Desktop Services	4	25	5	6	6	7	8	9	12
- Network Management	7	28	8	9	11	13	16	18	18
Processing Services	206		212	217	220	224	229	233	2
- Transaction Processing	206	3	212	217	220	224	229	233	2
Network Services	254	17	298	348	404	469	547	638	16
- Electronic Information Svcs	163	18	192	225	263	307	359	420	17
- Network Applications	91	16	106	123	141	162	188	218	16
Applications Software	828	12	927	1,034	1,154	1,282	1,430	1,595	11
- Mainframe	85	1	86	88	88	89	90	89	1
- Minicomputer	195	8	211	226	239	250	266	283	6
- Workstation/PC	548	15	630	720	827	943	1,074	1,223	14
Turnkey Systems	262	6	277	295	315	334	359	385	7
- Equipment	120	6	127	135	143	150	160	171	6
- Software Products	100	5	105	112	120	129	140	152	8
- Professional Services	42	7	45	48	52	55	59	62	7

B
Forecast Reconciliation

Exhibit A-2 presents the forecast reconciliation of the 1993 and 1994 forecasts for the education sector.

Education Sector, 1994 MAP Database Reconciliation

Product/ Service Market	1993 Market				1998 Market				93-98 CAGR per data '93 Rpt (%)	93-98 CAGR per data '94 Rpt (%)
	1993 Market (Forecast) ($M)	1994 Report (Actual) ($M)	Variance From 1993 Forecast ($M)	(%)	1993 Market (Forecast) ($M)	1994 Report (Forecast) ($M)	Variance From 1993 Forecast ($M)	(%)		
Total	2,043	2,050	7	0	3,650	3,611	-39	-1	12	12
Professional Services	98	98	0	0	162	161	-1	-1	11	10
Systems Integration	121	121	0	0	269	266	-3	-1	17	17
Outsourcing	280	281	1	0	625	619	-6	-1	17	17
Processing Services	205	206	1	0	231	229	-2	-1	2	2
Network Services	253	254	1	0	553	547	-6	-1	17	17
Applications Software	825	828	3	0	1,447	1,430	-17	-1	12	12
Turnkey Systems	261	262	1	0	363	359	-4	-1	7	7

There were only minor differences between the 1993 projection for the 1993 market and the actual expenditures reported in the 1994 forecast. The maximum variance was $7 million in the total education market, or less than a 0.5% total market understatement in 1993, which rounds to the 0% shown in the exhibit. The small variances are due to the basic stability of the current education marketplace.

Variances in the projections for product/service markets for 1998 range from -$1 million for professional services to -$17 million for application software. In terms of percentage variance, all values rounded to a $39 million or 1% overstatement of 1998 performance

rounded to a $39 million or 1% overstatement of 1998 performance in the 1993 report. The small but consistent 1% variations result from a slight flattening of the overall growth, even though it remains at an overall (rounded) level of 12% through 1998. INPUT estimates that growth will increase slightly in 1999, to 13% over the prior year, as accumulated increases in key infrastructure elements—students, teachers and budgets—have a positive affect on IS expenditures.

There is only one variance in the five-year CAGRs for the education sector—a minor 1% reduction in the growth rate for professional services. This small change is driven by a slight downward revision of the market for software development in 1998, due to the growing availability of packaged software for use in all segments of this market.